

Journal of **MOLECULAR BIOLOGY**

EDITOR-IN-CHIEF

J. C. KENDREW

ASSISTANT EDITOR

S. BRENNER

EDITORIAL BOARD

R. L. Baldwin

J. M. Bishop

M. S. Bretscher

C. R. Cantor

J. Davies

W. F. Dove

G. A. Gilbert

M. Gottesman

R. Huber

A. Klug

D. E. Koshland

S. Lowey

V. Luzzati

M. F. Moody

D. Nathans

D. C. Phillips

C. C. Richardson

P. M. B. Walker

J. C. Wang

S. M. Weissman

VOLUME 107

15 October 1976 to 15 November 1976



ACADEMIC PRESS

London New York San Francisco

Copyright © 1976, by Academic Press Inc. (London) Ltd.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 107

NUMBER 1, 15 OCTOBER 1976

FIDDES, J. C., Nucleotide Sequences of the Intercistronic Region between Genes <i>G</i> and <i>F</i> in Bacteriophage ϕ X174 DNA	1
CHIANCONE, E., BULL, T. E., NORNE, J.-E., FORSÉN, S. and ANTONINI, E., Studies on Erythrocrucorin. V. Nuclear Magnetic Resonance Quadrupole Relaxation Study of Sodium, Calcium and Chloride Binding	25
SHOWE, M. K., ISOBE, E. and ONORATO, L., Bacteriophage T4 Prehead Proteinase. I. Purification and Properties of a Bacteriophage Enzyme which Cleaves the Capsid Precursor Proteins	35
SHOWE, M. K., ISOBE, E. and ONORATO, L., Bacteriophage T4 Prehead Proteinase. II. Its Cleavage from the Product of Gene <i>21</i> and Regulation in Phage-infected Cells	55
HALL, B. G., Experimental Evolution of a New Enzymatic Function. Kinetic Analysis of the Ancestral (<i>ebg</i> ^o) and Evolved (<i>ebg</i> ⁺) Enzymes	71
LETTER TO THE EDITOR	
RAMACHANDRAN, G. N. and MITRA, A. K., An Explanation for the Rare Occurrence of <i>cis</i> Peptide Units in Proteins and Polypeptides	85

NUMBER 2, 25 OCTOBER 1976

BÜTTNER, W., VERES-MOLNÁR, Z. and GREEN, M., Preparative Isolation and Mapping of Adenovirus 2 Early Messenger RNA Species	93
MARINO, W., AMMER, S. and SHAPIRO, L., Conditional Surface Structure Mutants of <i>Caulobacter crescentus</i> Temperature-sensitive Flagella Formation Due to an Altered Flagellin Monomer	115
BURNETTE, W. N., HOLLADAY, L. A. and MITCHELL, W. M., Physical and Chemical Properties of Moloney Murine Leukemia Virus p30 Protein: A Major Core Structural Component Exhibiting High Helicity and Self-association	131
RECORD, M. T., JR, LOHMAN, T. M. and DE HASETH, P., Ion Effects on Ligand-Nucleic Acid Interactions	145
McLACHLAN, A. D., Evidence for Gene Duplication in Collagen	159

LETTERS TO THE EDITOR

- BROCK, C. J., HARRIS, J. I. and SATO, S., Superoxide Dismutase from *Bacillus stearothermophilus*. Preparation of Stable Apoprotein and Reconstitution of Fully Active Mn Enzyme 175

- PIERROT, M., HASER, R., FREY, M., BRUSCHI, M., LE GALL, J., SIEKER, L. C. and JENSEN, L. H., Some Comparisons between Two Crystallized Anaerobic Bacterial Rubredoxins from *Desulfovibrio gigas* and *D. vulgaris* 179

NUMBER 3, 5 NOVEMBER 1976

- SUZUKI, Y. and GIZA, P. E., Accentuated Expression of Silk Fibroin Genes *in vivo* and *in vitro* 183

- DEONIER, R. C. and DAVIDSON, N., The Sequence Organization of the Integrated F Plasmid in Two Hfr Strains of *Escherichia coli* 207

- LAMBOWITZ, A. M., CHUA, N-H. and LUCK, D. J. L., Mitochondrial Ribosome Assembly in *Neurospora*. Preparation of Mitochondrial Ribosomal Precursor Particles, Site of Synthesis of Mitochondrial Ribosomal Proteins and Studies on the *poky* Mutant 223

- WALLACE, B. A., RICHARDS, F. M. and ENGELMAN, D. M., The Influence of Lipid State on the Planar Distribution of Membrane Proteins in *Acholeplasma laidlawii* 255

- SERWER, P., Internal Proteins of Bacteriophage T7 271

- KEIL-DLOUHA, V., MISRAHI, R. and KEIL, B., The Induction of Collagenase and a Neutral Proteinase by their High Molecular Weight Substrates in *Achromobacter iophagus* 293

- KATSURA, I., Morphogenesis of Bacteriophage Lambda Tail. Polymorphism in the Assembly of the Major Tail Protein 307

- ROBSON, B. and SUZUKI, E., Conformational Properties of Amino Acid Residues in Globular Proteins 327

- SUZUKI, E. and ROBSON, B., Relationship between Helix-Coil Transition Parameters for Synthetic Polypeptides and Helix Conformation Parameters for Globular Proteins. A Simple Model 357

LETTERS TO THE EDITOR

- SAIGO, K., A New Bacteriophage T5 Particle with a DNA Lacking the Terminal Repetition at the "Right-hand" End 369

CONTENTS

v

WACHTEL, E. J., MARVIN, F. J. and MARVIN, D. A., Structural Transition in a Filamentous Protein	379
KABACK, D. B., HALVORSON, H. O. and RUBIN, G. M., Location and Magnification of 5 S RNA Genes in <i>Saccharomyces cerevisiae</i>	385

NUMBER 4, 15 NOVEMBER 1976

SEDAT, J., ZIFF, E. and GALIBERT, F., Direct Determination of DNA Nucleotide Sequences. Structure of Large Specific Fragments of Bacteriophage ϕ X174 DNA	391
BLACKBURN, E. H., Transcription and Sequence Analysis of a Fragment of Bacteriophage ϕ X174 DNA	417
AIR, G. M., Amino Acid Sequences from the Gene <i>F'</i> (Capsid) Protein of Bacteriophage ϕ X174	433
AIR, G. M., BLACKBURN, E. H., COULSON, A. R., GALIBERT, F., SANGER, F., SEDAT, J. W. and ZIFF, E. B., Gene <i>F'</i> of Bacteriophage ϕ X174. Correlation of Nucleotide Sequences from the DNA and Amino Acid Sequences from the Gene Product	445
SHAPIRO, S. Z., STRAND, M. and AUGUST, J. T., High Molecular Weight Precursor Polypeptides to Structural Proteins of Rauscher Murine Leukemia Virus	459
BOUBLIK, M., HELLMANN, W. and ROTH, H. E., Localization of Ribosomal Proteins L7L12 in the 50 S Subunit of <i>Escherichia coli</i> Ribosomes by Electron Microscopy	479
PROUDFOOT, N. J., Sequence Analysis of the 3' Non-coding Regions of Rabbit α - and β -Globin Messenger RNAs.	491
CHENG, C. C., BROWNLEE, G. G., CAREY, N. H., DOEL, M. T., GILLAM, S. and SMITH, M., The 3' Terminal Sequence of Chicken Ovalbumin Messenger RNA and its Comparison with other Messenger RNA Molecules	527
HOPKINS, A. S., MURRAY, N. E. and BRAMMAR, W. J., Characterization of <i>Atp</i> -transducing Bacteriophages made <i>in vitro</i>	549
OLSEN, K. W., GARAVITO, R. M., SABESAN, M. N. and ROSSMANN, M. G., Anion Binding Sites in the Active Center of D-Glyceraldehyde-3-Phosphate Dehydrogenase	571
OLSEN, K. W., GARAVITO, R. M., SABESAN, M. N. and ROSSMANN, M. G., Studies on Coenzyme Binding to Glyceraldehyde-3-Phosphate Dehydrogenase	577
DOHME, F. and NIERHAUS, K. H., Total Reconstitution and Assembly of 50 S Subunits from <i>Escherichia coli</i> Ribosomes <i>in vitro</i>	585

CAMERMAN, N., FAWCETT, J. K. and CAMERMAN, A., Molecular Structure of a Deoxyribose-dinucleotide, Sodium Thymidylyl-(5' $\rightarrow$ 3')-Thymidylate-(5') Hydrate (pTpT), and a Possible Structural Model for Polythymidylate . .	601
LETTER TO THE EDITOR	
NACHMIAS, V. T., Adenosine 5'-phosphate and Assembly of Actin Filaments <i>in vitro</i>	623
ANNOUNCEMENT	631

Index to Volume 107

- Acholeplasma laidlawii* membrane proteins, influence of lipid state on the planar distribution, 255
- Achromobacter iophagus*, induction of collagenase and a neutral proteinase by their high molecular weight substrates, 293
- Actin filament assembly *in vitro*, and adenosine 5'-phosphate, 623
- Adenosine 5'-phosphate and assembly of actin filaments *in vitro*, 623
- Adenovirus 2 early mRNA species, preparative isolation and mapping, 93
- AIR, G. M., BLACKBURN, E. H., COULSON, A. R., GALIBERT, F., SANGER, F., SEDAT, J. W. & ZIFF, E. B., Gene *F* of bacteriophage ϕ X174. Correlation of nucleotide sequences from the DNA and amino acid sequences from the gene product, 445
- Amino acid sequences from the gene *F* (capsid) protein of bacteriophage ϕ X174, 433
- Amino acid and DNA nucleotide sequences, correlation for the gene *F* product of bacteriophage ϕ X174, 445
- — residues in globular proteins, conformational properties, 327
- — sequences from the gene *F* (capsid) protein of bacteriophage ϕ X174, 433
- AMMER, S. (see also MARINO, W.), 115
- Anion binding sites in the active centre of D-glyceraldehyde-3-phosphate dehydrogenase, 571
- ANTONINI, E. (see also CHIANCONE, E.), 25
- Apoprotein preparation and reconstitution of fully active Mn enzyme from *Bacillus stearothermophilus* superoxide dismutase, 175
- AUGUST, J. T. (see also SHAPIRO, S. Z.), 459
- Bacillus stearothermophilus* superoxide dismutase. Preparation of stable apoprotein and reconstitution of fully active Mn enzyme, 175
- Bacterial, anaerobic, rubredoxins, crystallized, from *Desulfovibrio gigas* and *D. vulgaris*, 179
- Bacteriophage lambda tail morphogenesis. Polymorphism in the assembly of the major tail protein, 307
- ϕ X174, amino acid sequences from the gene *F* (capsid) protein, 433
- — DNA, nucleotide sequence of the intercistronic region between genes *G* and *F*, 1
- — —, structure of large specific fragments, 391
- — —, transcription and sequence analysis of a fragment, 417
- — gene *F*, correlation of nucleotide sequences from the DNA and amino acid sequences from the gene product, 445
- T4 prehead proteinase: its cleavage from the product of gene *21* and regulation in phage-infected cells, 55
- — — proteinase: purification and properties of a bacteriophage enzyme which cleaves the capsid precursor proteins, 35
- T5 particle, new, with a DNA lacking the terminal repetition at the "right-hand" end, 369
- T7 internal proteins, 271
- Bacteriophages, *ltrp*-transducing, made *in vitro*, characterization, 549
- Binding, coenzyme, to glyceraldehyde-3-phosphate dehydrogenase, 577
- sites, anion, in the active centre of D-glyceraldehyde-3-phosphate dehydrogenase, 571
- BLACKBURN, E. H., Transcription and sequence analysis of a fragment of bacteriophage ϕ X174 DNA, 417
- (see also AIR, G. M.), 445
- BOUBLIK, M., HELLMANN, W. & ROTH, H. E., Localization of ribosomal proteins L7L12 in the 50 S subunit of *Escherichia coli* ribosomes by electron microscopy, 479
- BRAMMAR, W. J. (see also HOPKINS, A. S.), 549
- BROCK, C. J., HARRIS, J. I. & SATO, S., Superoxide dismutase from *Bacillus stearothermophilus*. Preparation of stable apoprotein and reconstitution of fully active Mn enzyme, 175
- BROWNLEE, G. G. (see also CHENG, C. C.), 527
- BRUSCHI, M. (see also PIERROT, M.), 179
- BULL, T. E. (see also CHIANCONE, E.), 25
- BURNETTE, W. N., HOLLADAY, L. A. & MITCHELL, W. M., Physical and chemical properties of Moloney murine leukemia virus p30 protein: a major core structural component exhibiting high helicity and self-association, 131

- BÜTTNER, W., VERES-MOLNÁR, Z. & GREEN, M., Preparative isolation and mapping of adeno-virus 2 early mRNA species, 93
- Calcium, sodium and chloride binding to erythrocyruorin, nuclear magnetic resonance quadrupole relaxation study, 25
- CAMERMAN, A. (see also CAMERMAN, N.), 601
- CAMERMAN, N., FAWCETT, J. K. & CAMERMAN, A., Molecular structure of a deoxyribose-dinucleotide, sodium thymidylyl-(5'→3')-thymidylate-(5') hydrate (pTpT), and a possible structural model for polythymidylate, 601
- Capsid gene *F* protein of bacteriophage ϕ X174, amino acid sequences, 433
- precursor proteins, T4, cleavage by a bacteriophage enzyme, 35
- CAREY, N. H. (see also CHENG, C. C.), 527
- Caulobacter crescentus* temperature-sensitive flagella formation, conditional surface structure mutants due to an altered flagellin monomer, 115
- CHENG, C. C., BROWNLEE, G. G., CAREY, N. H., DOEL, M. T., GILLAM, S. & SMITH, M., The 3' terminal sequence of chicken ovalbumin mRNA and its comparison with other mRNA molecules, 527
- CHIANCONE, E., BULL, T. E., NORNE, J.-E., FORSÉN, S. & ANTONINI, E., Studies on erythrocyruorin. V. Nuclear magnetic resonance quadrupole relaxation study of sodium, calcium and chloride binding, 25
- Chicken ovalbumin mRNA, the 3' terminal sequence and its comparison with other mRNA molecules, 527
- Chloride, sodium and calcium binding to erythrocyruorin, nuclear magnetic resonance quadrupole relaxation study, 25
- CHUA, N.-H. (see also LAMBOWITZ, A. M.), 223
- Cleavage of capsid precursor proteins by bacteriophage enzyme, 35
- Coenzyme binding to glyceraldehyde-3-phosphate dehydrogenase, 577
- Collagen, evidence for gene duplication, 159
- Collagenase and a neutral proteinase, induction by their high molecular weight substrates in *Achromobacter iophagus*, 293
- Conformation parameters, helix, for globular proteins, relationship to helix-coil transition parameters for synthetic polypeptides; a simple model, 357
- Conformational properties of amino acid residues in globular proteins, 327
- COULSON, A. R. (see also AIR, G. M.), 445
- Crystallized anaerobic bacterial rubredoxins from *Desulfovibrio gigas* and *D. vulgaris*, 179
- DAVIDSON, N. (see also DEONIER, R. C.), 207
- DE HASETH, P. (see also RECORD, M. T., JR), 145
- DEONIER, R. C. & DAVIDSON, N., The sequence organization of the integrated F plasmid in two Hfr strains of *Escherichia coli*, 207
- DNA and amino acid nucleotide sequences, correlation for the gene *F* product of bacteriophage ϕ X174, 445
- of bacteriophage ϕ X174, nucleotide sequence of the intercistronic region between genes *G* and *F*, 1
- fragment of bacteriophage ϕ X174, transcription and sequence analysis, 417
- of a new bacteriophage T5 particle lacks the terminal repetition at the "right-hand" end, 369
- nucleotide sequences, direct determination: structure of large specific fragments of bacteriophage ϕ X174 DNA, 391
- Deoxyribose-dinucleotide sodium thymidylyl-(5'→3')-thymidylate-(5') hydrate (pTpT), molecular structure, and a possible structural model for polythymidylate, 601
- Desulfovibrio gigas* and *D. vulgaris*, some comparisons between two crystallized anaerobic bacterial rubredoxins, 179
- DOEL, M. T. (see also CHENG, C. C.), 527
- DOHME, F. & NIERHAUS, K. H., Total reconstitution and assembly of 50 S subunits from *Escherichia coli* ribosomes *in vitro*, 585
- ebg*^o (ancestral) and *ebg*⁺ (evolved) enzymes, kinetic analysis, 71
- Electron microscopy: localization of ribosomal proteins L7L12 in the 50 S subunit of *Escherichia coli* ribosomes, 479

- ENGELMAN, D. M. (see also WALLACE, B. A.), 255
- Enzymatic function, new, experimental evolution: kinetic analysis of the ancestral (*ebg*[°]) and evolved (*ebg*⁺) enzymes, 71
- Erythrocyruorin studies. Nuclear magnetic resonance quadrupole relaxation study of sodium, calcium and chloride binding, 25
- Escherichia coli* 50 S ribosomal proteins L7L12, localization by electron microscopy, 479
- — — — — subunits, total reconstitution and assembly *in vitro*, 585
- — —, the sequence organization of the integrated F plasmid in two Hfr strains, 207
- Evolution, experimental, of a new enzymatic function. Kinetic analysis of the ancestral (*ebg*[°]) and evolved (*ebg*⁺) enzymes, 71
- F plasmid, integrated, sequence organization in two Hfr strains of *Escherichia coli*, 207
- FAWCETT, J. K. (see also CAMERMAN, N.), 601
- Fibroin genes, silk, accentuated expression *in vivo* and *in vitro*, 183
- FIDDES, J. C., Nucleotide sequences of the intercistronic region between genes *G* and *F* in bacteriophage ϕ X174 DNA, 1
- Filamentous protein, structural transition, 379
- Filaments of actin, assembly *in vitro*, and adenosine 5'-phosphate, 623
- Flagella formation, temperature-sensitive, for *Caulobacter crescentus*, conditional surface structure mutants due to an altered flagellin monomer, 115
- FORSÉN, S. (see also CHIANCONE, E.), 25
- FREY, M. (see also PIERROT, M.), 179
- GALIBERT, F. (see also AIR, G. M.), 445
- GALIBERT, F. (see also SEDAT, J.), 391
- GARAVITO, R. M. (see also OLSEN, K. W.), 571, 577
- Gene 21 product cleavage and bacteriophage T4 prehead proteinase, 55
- duplication in collagen, 159
- *F* of bacteriophage ϕ X174. Correlation of nucleotide sequences from the DNA and amino acid sequences from the gene product, 445
- — (capsid) protein of bacteriophage ϕ X174, amino acid sequences, 433
- Genes *G* to *F* intercistronic region, nucleotide sequence in bacteriophage ϕ X174 DNA, 1
- , fibroin, silk, accentuated expression *in vivo* and *in vitro*, 183
- , 5 S RNA, location and magnification in *Saccharomyces cerevisiae*, 385
- GILLAM, S. (see also CHENG, C. C.), 527
- GIZA, P. E. (see also SUZUKI, Y.), 183
- Globin, α - and β -, mRNAs, sequence analysis of the 3' non-coding regions, 491
- Globular proteins, conformational properties of amino acid residues, 327
- , relationship between their helix conformation parameters and the helix-coil transition parameters for synthetic polypeptides; a simple model, 357
- Glyceraldehyde-3-phosphate dehydrogenase, studies on coenzyme binding, 577
- D-Glyceraldehyde-3-phosphate dehydrogenase, anion binding sites in the active center, 571
- GREEN, M. (see also BÜTTNER, W.), 93
- HALL, B. G., Experimental evolution of a new enzymatic function. Kinetic analysis of the ancestral (*ebg*[°]) and evolved (*ebg*⁺) enzymes, 71
- HALVORSON, H. O. (see also KABACK, D. B.), 385
- HARRIS, J. I. (see also BROCK, C. J.), 175
- HASER, R. (see also PIERROT, M.), 179
- Helix-coil transition parameters for synthetic polypeptides, relationship to helix conformation parameters for globular proteins; a simple model, 357
- HELLMANN, W. (see also BOUBLIK, M.), 479
- Hfr strains P4X and P804 of *Escherichia coli*, sequence organization of the integrated F plasmid, 207
- HOLLADAY, L. A. (see also BURNETTE, W. N.), 131
- HOPKINS, A. S., MURRAY, N. E. & BRAMMAR, W. J., Characterization of λ trp-transducing bacteriophages made *in vitro*, 549
- Induction of collagenase and a neutral proteinase by their high molecular weight substrates in *Achromobacter iophagus*, 293

- Intercistronic nucleotide sequence between genes *G* and *F* in bacteriophage ϕ X174 DNA, 1
- Ion effects on ligand-nucleic acid interactions, 145
- ISOBE, E. (see also SHOWE, M. K.), 35, 55
- JENSEN, L. H. (see also PIERROT, M.), 179
- KABACK, D. B., HALVORSON, H. O. & RUBIN, G. M., Location and magnification of 5 S RNA genes in *Saccharomyces cerevisiae*, 385
- KATSURA, I., Morphogenesis of bacteriophage lambda tail. Polymorphism in the assembly of the major tail protein, 307
- KEIL, B. (see also KEIL-DLOUHA, V.), 293
- KEIL-DLOUHA, V., MISRAHI, R. & KEIL, B., The induction of collagenase and a neutral proteinase by their high molecular weight substrates in *Achromobacter iophagus*, 293
- L7L12 proteins in the 50 S subunit of *Escherichia coli* ribosomes, localization by electron microscopy, 479
- λ (see also Bacteriophage), 307
- ltrp*-transducing bacteriophages made *in vitro*, characterization, 549
- LAMBOWITZ, A. M., CHUA, N.-H. & LUCK, D. J. L., Mitochondrial ribosome assembly in *Neurospora*. Preparation of mitochondrial ribosomal precursor particles, site of synthesis of mitochondrial ribosomal proteins and studies on the *poky* mutant, 223
- LE GALL, J. (see also PIERROT, M.), 179
- LEUKEMIA virus, murine, Moloney, physical and chemical properties of p30 protein: a major core structural component exhibiting high helicity and self-association, 131
- —, murine, Rauscher, high molecular weight precursor polypeptides to structural proteins, 459
- Ligand-nucleic acid interactions, ion effects, 145
- Lipid state influence on the planar distribution of membrane proteins in *Acholeplasma laidlawii*, 255
- LOHMAN, T. M. (see also RECORD, M. T., JR.), 145
- LUCK, D. J. L. (see also LAMBOWITZ, A. M.), 223
- McLACHLAN, A. D., Evidence for gene duplication in collagen, 159
- Magnification and location of 5 S RNA genes in *Saccharomyces cerevisiae*, 385
- Mapping and preparative isolation of adenovirus 2 early mRNA species, 93
- MARINO, W., AMMER, S. & SHAPIRO, L., Conditional surface structure mutants of *Caulobacter crescentus* temperature-sensitive flagella formation due to an altered flagellin monomer, 115
- MARVIN, D. A. (see also WACHTEL, E. J.), 379
- MARVIN, F. J. (see also WACHTEL, E. J.), 379
- Membrane proteins in *Acholeplasma laidlawii*, influence of lipid state on the planar distribution, 255
- Messenger RNA of chicken ovalbumin, the 3' terminal sequence and its comparison with other mRNA molecules, 527
- —, early, of adenovirus 2, preparative isolation and mapping, 93
- —, RNAs of rabbit α - and β -globin, sequence analysis of the 3' non-coding regions, 491
- MISRAHI, R. (see also KEIL-DLOUHA, V.), 293
- MITCHELL, W. M. (see also BURNETTE, W. N.), 131
- Mitochondrial ribosome assembly in *Neurospora*. Preparation of mitochondrial ribosomal precursor particles, site of synthesis of mitochondrial ribosomal proteins and studies on the *poky* mutant, 223
- MITRA, A. K. (see also RAMACHANDRAN, G. N.), 85
- Mn enzyme reconstitution and apoprotein preparation from *Bacillus stearothermophilus* superoxide dismutase, 175
- Moloney murine leukemia virus p30 protein, physical and chemical properties: a major core structural component exhibiting high helicity and self-association, 131
- Morphogenesis of bacteriophage lambda tail. Polymorphism in the assembly of the major tail protein, 307
- Murine leukemia virus, Rauscher, high molecular weight precursor polypeptides to structural proteins, 459
- leukemia virus, Moloney, physical and chemical properties of p30 protein: a major core structural component exhibiting high helicity and self-association, 131

- MURRAY, N. E. (see also HOPKINS, A. S.), 549
- Mutant, *poky*, of *Neurospora*, mitochondrial ribosome assembly, 223
- Mutants, surface structure, of *Caulobacter crescentus* temperature-sensitive flagella formation due to an altered flagellin monomer, 115
- NACHMIAS, V. T., Adenosine 5'-phosphate and assembly of actin filaments *in vitro*, 623
- Neurospora* mitochondrial ribosome assembly. Preparation of mitochondrial ribosomal precursor particles, site of synthesis of mitochondrial ribosomal proteins and studies on the *poky* mutant, 223
- NIERHAUS, K. H. (see also DOHME, F.), 585
- NORNE, J.-E. (see also CHIANCONE, E.), 25
- Nuclear magnetic resonance quadrupole relaxation study of sodium, calcium and chloride binding to erythrocytes, 25
- Nucleic acid-ligand interactions, ion effects, 145
- Nucleotide sequences, correlation for the DNA and amino acid sequences from the gene *F* product of bacteriophage ϕ X174, 445
- of DNA, direct determination: structure of large specific fragments of bacteriophage ϕ X174 DNA, 391
- of the intercistronic region between genes *G* and *F* in bacteriophage ϕ X174 DNA, 1
- OLSEN, K. W., GARAVITO, R. M., SABESAN, M. N. & ROSSMANN, M. G., Anion binding sites in the active center of D-glyceraldehyde-3-phosphate dehydrogenase, 571
- , —, — & —, Studies on coenzyme binding to glyceraldehyde-3-phosphate dehydrogenase, 577
- ONORATO, L. (see also SHOWE, M. K.), 35, 55
- Ovalbumin mRNA of chicken, the 3' terminal sequence and its comparison with other mRNA molecules, 527
- ϕ X174 (see also Bacteriophage), 1, 391, 417, 433, 445
- cis* Peptide units, an explanation for their rare occurrence in proteins and polypeptides, 85
- PIERROT, M., HASER, R., FREY, M., BRUSCHI, M., LE GALL, J., SIEKER, L. C. & JENSEN, L. H., Some comparisons between two crystallized anaerobic bacterial rubredoxins from *Desulfovibrio gigas* and *D. vulgaris*, 179
- Planar distribution of membrane proteins in *Acholeplasma laidlawii*, influence of lipid state, 255
- poky* mutant of *Neurospora*, mitochondrial ribosome assembly, 223
- Polymorphism in the assembly of the major tail protein of bacteriophage lambda, 307
- Polypeptides, precursor, high molecular weight, to structural proteins of Rauscher murine leukemia virus, 459
- and proteins, an explanation for the rare occurrence of *cis* peptide units, 85
- , synthetic, relationship between their helix-coil transition parameters and the helix conformation parameters for globular proteins; a simple model, 357
- Polythymidylate structural model and the molecular structure of a deoxyribose-dinucleotide, sodium thymidyl-(5'→3')-thymidylate-(5') hydrate (pTpT), 601
- Precursor polypeptides, high molecular weight, to structural proteins of Rauscher murine leukemia virus, 459
- Precursors to T4 capsid proteins, cleavage by bacteriophage enzyme, 35
- Prehead proteinase of bacteriophage T4: its cleavage from the product of gene 21 and regulation in phage-infected cells, 55
- — — — —: purification and properties of a bacteriophage enzyme which cleaves the capsid precursor proteins, 35
- Protein, capsid, gene *F*, of bacteriophage ϕ X174, amino acid sequences, 433
- , filamentous, structural transition, 379
- , globular, conformational properties of amino acid residues, 327
- , major, of bacteriophage lambda tail, polymorphism in the assembly, 307
- p30 of Moloney murine leukemia virus, physical and chemical properties: a major core structural component exhibiting high helicity and self-association, 131
- Proteins, globular, relationship between their helix conformation parameters and the helix-coil transition parameters for synthetic polypeptides; a simple model, 357
- Proteins, internal, of bacteriophage T7, 271
- L7L12 in the 50 S subunit of *Escherichia coli* ribosomes, localization by electron microscopy, 479
- , membrane, in *Acholeplasma laidlawii*, influence of lipid state on the planar distribution, 255

- Proteins, mitochondrial ribosomal, of *Neurospora*, site of synthesis, 223
 — and polypeptides, an explanation for the rare occurrence of *cis* peptide units, 85
 —, structural, of Rauscher murine leukemia virus, high molecular weight precursor polypeptides, 459
 Proteinase, bacteriophage T4 prehead: its cleavage from the product of gene 21 and regulation in phage-infected cells, 55
 —, — — —: purification and properties of a bacteriophage enzyme which cleaves the capsid precursor proteins, 35
 —, neutral, and collagenase, induction by their high molecular weight substrates in *Achromobacter iophagus*, 293
 PROUDFOOT, N. J., Sequence analysis of the 3' non-coding regions of rabbit α - and β -globin mRNAs, 491
- Rabbit α - and β -globin mRNAs, sequence analysis of the 3' non-coding regions, 491
 RAMACHANDRAN, G. N. & MITRA, A. K., An explanation for the rare occurrence of *cis* peptide units in proteins and polypeptides, 85
 Rauscher murine leukemia virus, high molecular weight precursor polypeptides to structural proteins, 459
 Reconstitution, total, and assembly of 50 S subunits from *Escherichia coli* ribosomes *in vitro*, 585
 RECORD, M. T., JR, LOHMAN, T. M. & DE HASETH, P., Ion effects on ligand-nucleic acid interactions, 145
 Regulation of phage T4 prehead proteinase, 55
 RNA, messenger, of chicken ovalbumin, the 3' terminal sequence and its comparison with other mRNA molecules, 527
 —, —, early, of adenovirus 2, preparative isolation and mapping, 93
 —, —, of rabbit α - and β -globin, sequence analysis of the 3' non-coding regions, 491
 — 5 S genes, location and magnification in *Saccharomyces cerevisiae*, 385
 Ribosomal proteins L7L12 in the 50 S subunit of *Escherichia coli* ribosomes, localization by electron microscopy, 479
 — 50 S subunits of *Escherichia coli*, total reconstitution and assembly *in vitro*, 585
 Ribosome, mitochondrial, assembly in *Neurospora*. Preparation of mitochondrial ribosomal precursor particles, site of synthesis of mitochondrial ribosomal proteins and studies on the *poky* mutant, 223
 RICHARDS, F. M. (see also WALLACE, B. A.), 255
 ROBSON, B. & SUZUKI, E., Conformational properties of amino acid residues in globular proteins, 327
 — (see also SUZUKI, E.), 357
 ROSSMANN, M. G. (see also OLSEN, K. W.), 571, 577
 ROTH, H. E. (see also BOUBLIK, M.), 479
 RUBIN, G. M. (see also Kaback, D. B.), 385
 Rubredoxins, anaerobic bacterial, crystallized, from *Desulfovibrio gigas* and *D. vulgaris*, 179
- SABESAN, M. N. (see also OLSEN, K. W.), 571, 577
Saccharomyces cerevisiae, location and magnification of 5 S RNA genes, 385
 SAIGO, K., A new bacteriophage T5 particle with a DNA lacking the terminal repetition at the "right-hand" end, 369
 SANGER, F. (see also AIR, G. M.), 445
 SATO, S. (see also BROCK, C. J.), 175
 SEDAT, J., ZIFF, E. & GALIBERT, F., Direct determination of DNA nucleotide sequences. Structure of large specific fragments of bacteriophage ϕ X174 DNA, 391
 SEDAT, J. W. (see also AIR, G. M.), 445
 Sequence analysis of a fragment of bacteriophage ϕ X174 DNA, 417
 — — — the 3' non-coding regions of rabbit α - and β -globin mRNAs, 491
 —, nucleotide, of the intercistronic region between genes *G* and *F* in bacteriophage ϕ X174 DNA, 1
 — organization of the integrated F plasmid in two Hfr strains of *Escherichia coli*, 207
 —, 3' terminal, of chicken ovalbumin mRNA and its comparison with other mRNA molecules, 527
 Sequences of amino acids from the gene *F* (capsid) protein of bacteriophage ϕ X174, 433
 — — DNA nucleotides, direct determination: structure of large specific fragments of bacteriophage ϕ X174 DNA, 391
 — — nucleotides, correlation for the DNA and amino acid sequences from the gene *F* product of bacteriophage ϕ X174, 445
 SERWER, P., Internal proteins of bacteriophage T7, 271

- SHAPIRO, L. (see also MARINO, W.), 115
- SHAPIRO, S. Z., STRAND, M. & AUGUST, J. T., High molecular weight precursor polypeptides to structural proteins of Rauscher murine leukemia virus, 459
- SHOWE, M. K., ISOBE, E. & ONORATO, L., Bacteriophage T4 prehead proteinase. I. Purification and properties of a bacteriophage enzyme which cleaves the capsid precursor proteins, 35
- , — & —, — — — —. II. Its cleavage from the product of gene 21 and regulation in phage-infected cells, 55
- SIEKER, L. C. (see also PIERROT, M.), 179
- Silk fibroin genes, accentuated expression *in vivo* and *in vitro*, 183
- Smith, M. (see also CHENG, C. C.), 527
- Sodium, calcium and chloride binding to erythrocrucorin, nuclear magnetic resonance quadrupole relaxation study, 25
- thymidylyl-(5' → 3')-thymidylate-(5') hydrate (pTpT), a deoxyribose-dinucleotide, molecular structure, and a possible structural model for polythymidylate, 601
- STRAND, M. (see also SHAPIRO, S. Z.), 459
- Structural transition in a filamentous protein, 379
- Structure of large specific fragments of bacteriophage ϕ X174 DNA, 391
- , molecular, of a deoxyribose-dinucleotide, sodium thymidylyl-(5' → 3')-thymidylate-(5') hydrate (pTpT), and a possible structural model for polythymidylate, 601
- Superoxide dismutase from *Bacillus stearothermophilus*. Preparation of stable apoprotein and reconstitution of fully active Mn enzyme, 175
- Surface structure mutants of *Caulobacter crescentus* temperature-sensitive flagella formation due to an altered flagellin monomer, 115
- SUZUKI, E. & ROBSON, B., Relationship between helix-coil transition parameters for synthetic polypeptides and helix conformation parameters for globular proteins. A simple model, 357
- (see also ROBSON, B.), 327
- SUZUKI, Y. & GIZA, P. E., Accentuated expression of silk fibroin genes *in vivo* and *in vitro*, 183
- T4 (see also Bacteriophage), 35, 55
- T5 (see also Bacteriophage), 369
- T7 (see also Bacteriophage), 271
- Tail protein, major, of bacteriophage lambda, polymorphism in the assembly, 307
- Transcription and sequence analysis of a fragment of bacteriophage ϕ X174 DNA, 417
- Transition parameters, helix-coil, for synthetic polypeptides, relationship to helix conformation parameters for globular proteins; a simple model, 357
- , structural, in a filamentous protein, 379
- VERES-MOLNÁR, Z. (see also BÜTTNER, W.), 93
- Virus, Moloney murine leukemia, physical and chemical properties of p30 protein: a major core structural component exhibiting high helicity and self-association, 131
- , Rauscher murine leukemia, high molecular weight precursor polypeptides to structural proteins, 459
- WACHTEL, E. J., MARVIN, F. J. & MARVIN, D. A., Structural transition in a filamentous protein, 379
- WALLACE, B. A., RICHARDS, F. M. & ENGELMAN, D. M., The influence of lipid state on the planar distribution of membrane proteins in *Acholeplasma laidlawii*, 255
- ZIFF, E. B. (see also SEDAT, J.), 391
- (see also AIR, G. M.), 445

